

ONKYO® SERVICE MANUAL

AUDIO VIDEO CONTROL RECEIVER MODEL TX-8511



Black model

| | |
|----------|-----------------------------|
| BMD | 120V AC, 60Hz |
| BMP | 230V AC, 50Hz |
| BMP/BMWT | 120V / 220-230V AC, 50/60Hz |

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK Δ ON THE SCHEMATIC DIAGRAM AND IN THE PARTS LIST ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE THESE COMPONENTS WITH ONKYO PARTS WHOSE PARTS NUMBERS APPEAR AS SHOWN IN THIS MANUAL.

MAKE LEAKAGE-CURRENT OR RESISTANCE MEASUREMENTS TO DETERMINE THAT EXPOSED PARTS ARE ACCEPTABLY INSULATED FROM THE SUPPLY CIRCUIT BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

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ONKYO® AUDIO COMPONENTS

SPECIFICATIONS

AMPLIFIER SECTION

Power Output:

USA & Canadian models: 100 Watts per channel, min RMS, at 8 ohms, both channels driven from 20 Hz to 20 kHz, with no more than 0.08% THD.

European models: 2 x 100 Watts at 4 ohms, 1 kHz (DIN).

Asian models: 2 x 130 Watts at 4 ohms, 1 kHz (ELAJ).

Dynamic power output:

USA & Canadian models: 2 x 170 Watts at 2 ohms
2 x 135 Watts at 4 ohms
2 x 140 Watts at 8 ohms

Other area models: 2 x 145 Watts at 2 ohms
2 x 120 Watts at 4 ohms
2 x 75 Watts at 8 ohms

Total Harmonic Distortion:

0.08% at rated power

0.08% at 1 watt output

IM Distortion:

0.08% at rated power

0.08% at 1 watt output

Damping Factor:

60 at 8 ohms

Input Sensitivity and Impedance:

PHONO: 2.5 mV, 50 kohms

Line (CD, TAPE-1, 2, VIDEO-1, 2): 150 mV, 50 kohms

Video (VIDEO-1, 2): 1 Vp-p, 75 ohms

Output Level and Impedance:

Rec out (TAPE-1, 2): 150 mV, 2.2 kohms

out (VIDEO-2): 150 mV, 2.2 kohms

Video (VIDEO-2, MONITOR): 1 Vp-p, 75 ohms

Phono Overload:

120 mV RMS, at 1,000 Hz, 0.5% THD.

Frequency Response:

20 to 30,000 Hz, ± 1 dB

RIAA Deviation: 20 to 20,000 Hz, ± 0.8 dB

Tone Control:

BASS: ± 10 dB at 100 Hz

TREBLE: ± 10 dB at 10,000 Hz

Signal to Noise Ratio:

PHONO: 80 dB (IHF A, 5 mV input)

CD/TAPE: 100 dB (IHF A)

Muting:

-50 dB

TUNER SECTION

FM:

Tuning Range:

U.S. and Canadian models: 87.50 to 108.00 MHz (100 kHz steps)

European and worldwide models:

87.50 to 108.00 MHz (50 kHz steps)

Mono: 11.2 dBf, 1.0 μ V (75 ohms IHF)

0.9 μ V (75 ohms DIN)

Stereo: 17.2 dBf, 2.0 μ V (75 ohms IHF)

23 μ V (75 ohm DIN)

50dB Quieting Sensitivity: Mono: 17.2 dBf, 2.0 μ V (75 ohms)

Stereo: 37.2 dBf, 20.0 μ V (75 ohms)

1.5 dB

Capture Ratio:

Image Rejection Ratio:

U.S. and Canadian models: 40 dB

Other models: 85 dB

| | |
|--|---|
| IF Rejection Ratio: | 90 dB |
| Signal-to-Noise Ratio: | Mono: 76 dB, IHF Stereo: 70 dB, IHF |
| Alternate Channel Att. (± 400 kHz): | Mono 55 dB, JHP 55 dB DIN (± 300 kHz 40 kHz Dev.) |
| Selectivity: | 50 dB |
| AM Suppression Ratio: | Mono: 0.15% Stereo: 0.25% |
| Total Harmonic Distortion: | 30 to 15,000 Hz ± 1.5 dB |
| Frequency Response: | 45 dB at 1,000 Hz |
| Stereo Separation: | 30 dB at 100 to 10,000 Hz |
| Stereo Threshold: | 17.2 dBf, 2.0 μ V (75 ohms) |
| AM: | |
| Tuning Range: | |
| U.S. and Canadian models: | 530 to 1,710 kHz (10 kHz steps) |
| European models: | 522 to 1,611 kHz (9 kHz steps) |
| Worldwide models: | 530 to 1,710 kHz (10 kHz steps) 531 to 1,602 kHz (9 kHz steps) |
| Usable Sensitivity: | 30 μ V |
| Image Rejection Ratio: | 40 dB |
| IF Rejection Ratio: | 40 dB |
| Signal-to-Noise Ratio: | 40 dB |
| Total Harmonic Distortion: | 0.7% |

GENERAL

Power Supply:

U.S. and Canadian models: AC120 V, 60 Hz

European and Australian models:

AC230 V, 50 Hz

Worldwide models: AC 220-230/120 V switchable, 50/60 Hz

Power Consumption:

U.S. and Canadian models: 2.8 A

Other models: 220 W

Dimensions (W \times H \times D):

435 \times 150 \times 322 mm

17-1/8" \times 5-7/8" \times 12-11/16"

Weight:

8.9 kg, 19.6 lbs

REMOTE CONTROL RC-329S

Transmitter:

Infrared

Signal range:

Approx. 5 meters, 16 ft.

Power supply:

Two "AA" batteries (1.5 V \times 2)

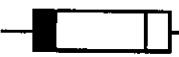
Specifications and features are subject to change without notice.

SERVICE PROCEDURES

1. Replacing the fuses



This symbol located near the fuse indicates that the fuse used is fast operating type. For continued protection against fire hazard, replace with same type fuse. For fuse rating refer to the marking adjacent to the symbol.



Ce symbole indique que le fusible utilise est a rapide. Pour une protection permanents, n'utiliser que des fusibles de meme type. Ce dernier est indique la qu le present symbol est appose.

Circuit No. Part No. Description

F901 252164 5A-UL/T-237 <D,WT>

F902 252075 2.5A-SE-EAK <P,PT,WT>

F903 252075 2.5A-SE-EAK <P,PT>

NOTE: <D>: 120V model only

<P>: 230V model only

<WT>: Taiwanese model only

<PT>: Asian model only

2. To Initialize the unit

This device employs a microprocessor to perform various functions and operations. If interference generated by an external power supply, radio wave, or other electrical source results in accident which causes the specified operations and functions to operate abnormally.

To perform a reset, please follow the procedure below.

1. Press and hold down the VIDEO-1 button, then press the SPEAKER-A button.

2. After "clear" is displayed, the preset memory and each mode stored in then memory, such as surround, are initialized and will return to the factory settings.

3. Safety-check out

(Only U.S.A. model)

After correcting the original service problem, perform the following safety check before releasing the set to the customer.

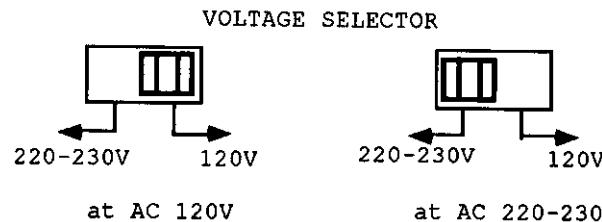
Connect the insulating-resistance tester between the plug of power supply cord and the screw on the back panel.

Specifications : 3.3Mohm±10% at 500V.

4. Change of voltage

Worldwide models are equipped with a voltage selector to conform to local power supplies. This switch is located on the back panel.

Be sure to set this switch to match the voltage of the power supply in your area before turning the power switch on. This switch is set to 220-230V at the factory. Voltage is changed by sliding the groove in the switch with the screwdriver to the right or left. Confirm that the switch has been moved all the way to the right or left before turning the power switch on.



5. Memory preservation

This unit does not require memory preservation batteries.

A built-in memory power back-up system preserves contents of the memory during power failures and even when the unit is unplugged.

The unit must be plugged in and the power switch turned on and off once in order to charge the back-up system. Note that since this is not a permanent memory, the power switch must be turned on and off a few times each month to keep the back-up system operative.

The period of the time during which memory contents are preserved after power has last been turned off varies depending on climate and placement of the unit. On the average, memory contents are protected over a period of 3 to 4 weeks (a minimum of 2 weeks) after the last time power has been turned off. This period is shortened when the unit is exposed to very high humidity or used in an area with an extremely humid climate.

6. Setting the tuning step frequency

Worldwide models are equipped with a step band selector switch. This switch is located on the back panel. This switch is set to 9 kHz at the factory, but may have to be reset to 10 kHz depending on the area where the unit is used.

AM band step

Other area: 9 kHz

U.S.A. & Canada: 10 kHz

TUNER FREQ.



7. Changing the band step.

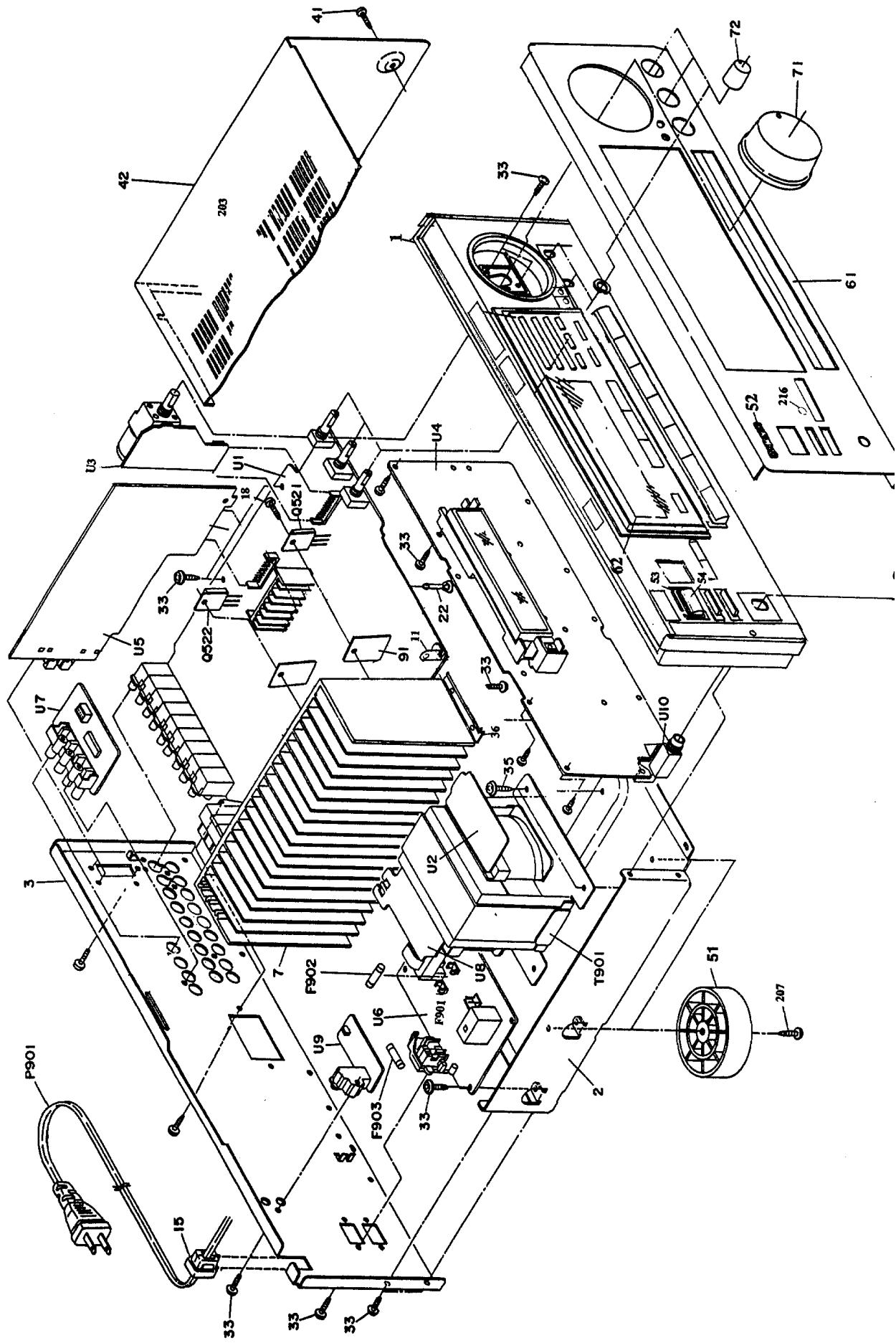
With the exception of the worldwide models, a tuning step selector switch is not provided. When you change the band step, change the parts as shown below.

To 10 kHz To 9 kHz

R727 Remove 10 ohm

R724 10K ohm Remove

EXPLoded VIEW

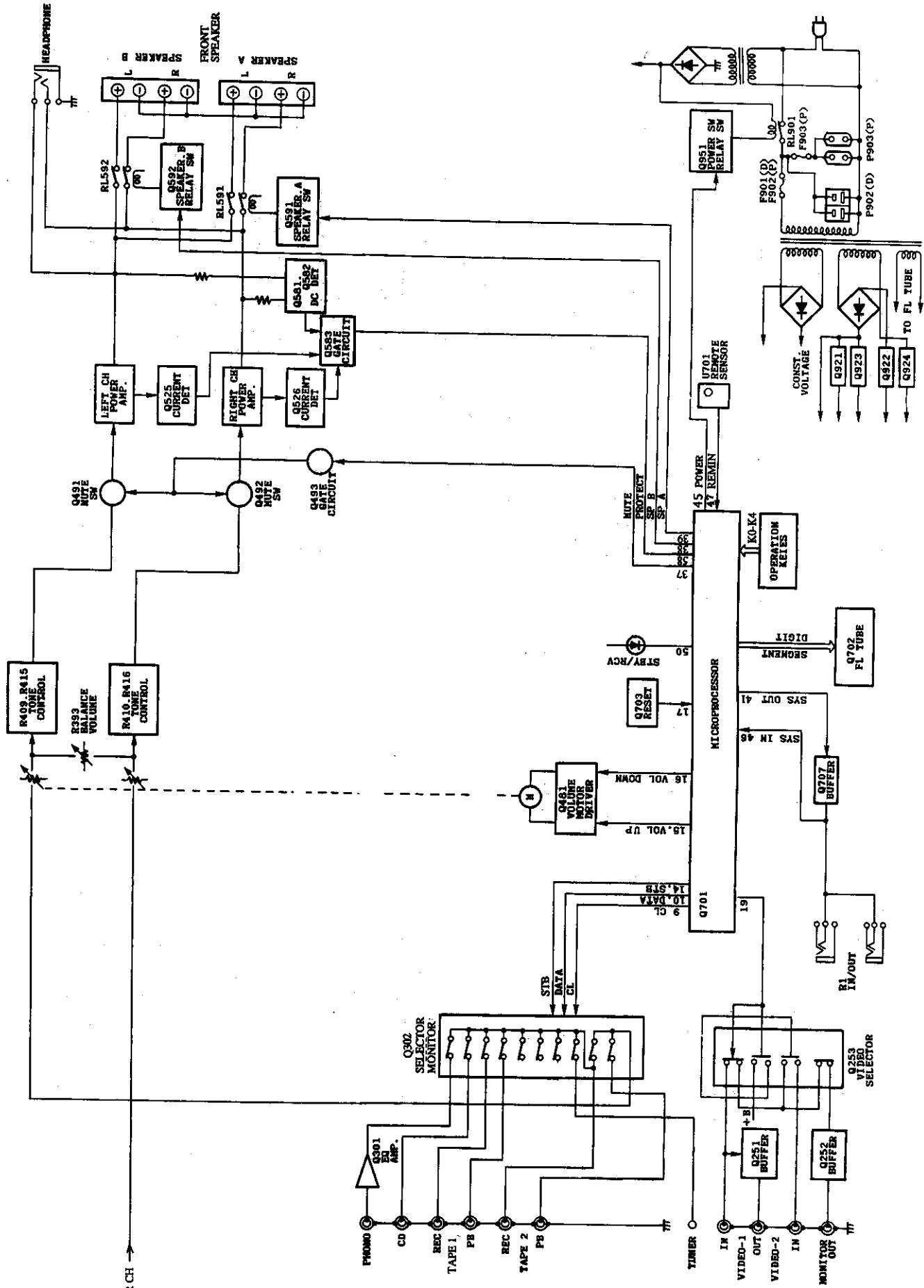


PARTS LIST

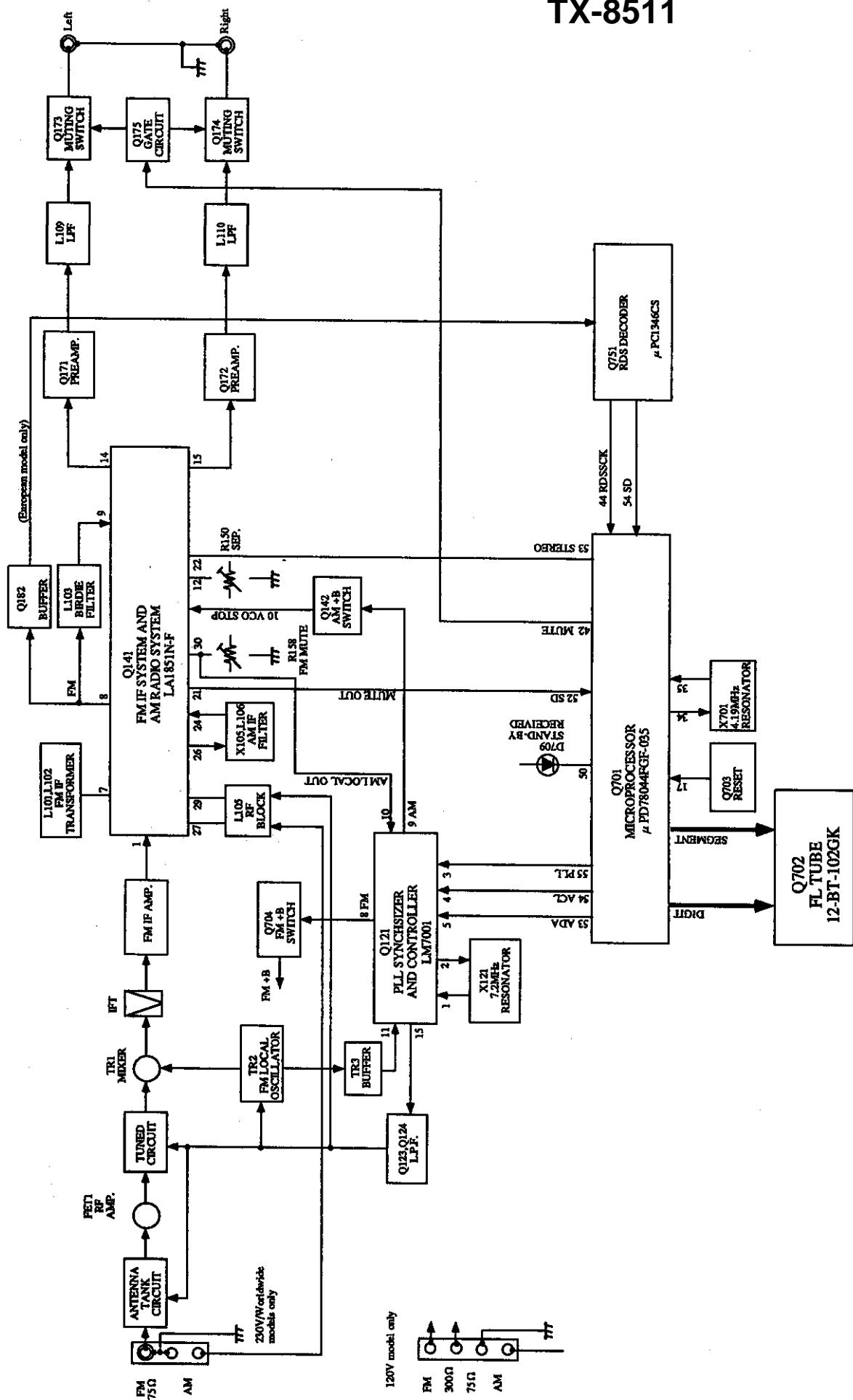
| REF. NO. | PART NO. | DESCRIPTION | REF. NO. | PART NO. | DESCRIPTION |
|----------|-------------------------|---------------------------------------|-----------|----------------------------|---|
| 1 | 27110952Y | Front Bracket | P901 | 253192HITY or 253194MAR | ▲ AS-UC-6#18, (SPT-2), Power supply cord <D> |
| 2 | 27100321AY | Chassis | | 253193HIT or 253195MAR | ▲ AS-CEE, Power supply cord <P,PT> |
| 3 | 27122285Y | Rear Panel <D> | | 253232KAW | ▲ AS-CEE-2, Power supply cord <WT> |
| | 27122286Y | Rear Panel <P> | | 2SC5200-O | Power transistors |
| | 27122287Y | Rear Panel <PT> | | 2SA1943-Q | Power transistors |
| 7 | 27122288Y | Rear Panel <WT> | Q521,Q522 | 2202823 | ▲ NPT-1280P, Power transformer <P> |
| | 27160379Y | Radiator | Q523,Q524 | 2202833 | ▲ NPT-1280P, Power transformer <PT> |
| 11 | 27141530A | Retainer (HS-2) | T901 | 2301214 | ▲ NPT-1280DG, Power transformer <WT> |
| 15 | 27300750 | ▲ Cord Bushing #2271 | | 2301214 | ▲ NPT-1281D, Power transformer <D> |
| 18 | 801433Y | 3SMS8W.SW+14B(BC), Self-tapping screw | | 2301215 | NAAR-5864-3A, Main circuit pc board ass'y <D> |
| 22 | 27190991 | Holder, KGPS-16RF | U1 | 1A725564-3AY | NAAR-5864-3B, Main circuit pc board ass'y <P,PT,WT> |
| 28 | 27190266-1Y | Holder, KGELS-12RF | | 1A725564-3BY | NAAR-5864-3C, Main circuit pc board ass'y <P,PT,WT> |
| 33 | 838330088Y | 3TTB+8B, Self-tapping screw | | 1A725566-3AY | NAETC 5866-3A, Power supply pc board ass'y <D> |
| 35 | 830440089Y | 4TTC+8C(BC), Self-tapping screw | U2 | 1A725566-3BY | NAETC 5866 3B, Power supply pc board <P,PT,WT> |
| 36 | 27141671Y | Retainer | | 1A725565-3AY | NAETC-5865-3A, Volume pc board ass'y <D> |
| 41 | 838430088Y | 3TTB+8B(BC), Self-tapping screw | U3 | 1A725565-3AY | NAETC-5865-3B, Volume pc board ass'y <D> |
| 42 | 28184663Y | Top Cover | | 1A725565-3BY | NAETC-5865-3B, Volume pc board ass'y <P,PT,WT> |
| 51 | 27175319Y | Leg | U4 | ~ | NADIS-5918-1A, Display circuit pc board ass'y <D> |
| 52 | 28135244Y | Badge | | 1A725518-1BY | NADIS-5918-1B, Display circuit pc board ass'y <P,PT> |
| 53 | 27267955Y | Guide (POW) <P,PT,WT> | | 1A725518-1CY | NADIS-5918-1C, Display circuit pc board ass'y <WT> |
| 54 | 28325451Y | Knob (POW) <P,PT,WT> | U5 | 1A725519-1AY | NARE-5919-1A, Tuner circuit pc board ass'y <D> |
| 61 | 27211863Y | Front Panel <D> | | 1A725519-1BY | NARE-5919-1B, Tuner circuit pc board ass'y <P,PT> |
| | 27211864Y | Front Panel <P,PT> | | 1A725519-1CY | NARE-5919-1C, Tuner circuit pc board ass'y <WT> |
| | 27211865AY | Front Panel <WT> | U6 | 1A725520-1AY | NAPS-5920-1A, Power supply circuit pc board ass'y <D> |
| | 62 | 28191753Y | | 1A725520-1BY | NAPS-5920-1B, Power supply circuit pc board ass'y <P,PT> |
| | 71 | 28325456Y | | 1A725520-1CY | NAPS-5920-1C, Power supply circuit pc board ass'y <WT> |
| | 72 | 28325454Y | | 1A725521-1AY | NAETC-5921-1A, Video circuit pc board ass'y <D> |
| | 91 | 223025 | | 1A725521-1BY | NAETC-5921-1B, Video circuit pc board ass'y <P,PT> |
| | 203 | 28141240Y | | 1A725521-1CY | NAETC-5921-1C, Video circuit pc board ass'y <WT> |
| | 206 | 28141332Y | | 1A725524-1AY | NAETC-5924-1A, Primary pc board ass'y <D> |
| | 207 | 831430088Y | | 1A725524-1BY | NAETC-5924-1B, Primary pc board ass'y <P,PT> |
| | 214 | 271215274Y | | 1A725524-1CY | NAETC-5924-1C, Primary pc board ass'y <WT> |
| | 216 | 28198778Y | | 1A725522-1AY | NADIS-5922-1A, RI Terminal circuit pc board ass'y <D> |
| D911 | 22380038 or 22380274 | ▲ RBV602 or ▲ RS603M, diode | | 1A725522-1BY | NADIS-5922-1B, RI Terminal circuit pc board ass'y <P,PT> |
| F901 | 252164 | ▲ 5A-JUL/T-237, Fuse <D,WT> | U10 | 1A725523-1AY | NAETC-5923-1A, Headphone pc board ass'y <D> |
| F902 | 252075 | ▲ 2.5A-SE-EAK, Fuse <P,PT,WT> | | 1A725523-1BY | NAETC-5923-1B, Headphone pc board ass'y <P,PT> |
| F903 | 252075 | ▲ 2.5A-SE-EAK, Fuse <P,PT> | | 1A725523-1CY | NAETC-5923-1C, Headphone pc board ass'y <WT> |
| P711 | 2047311512 | NCPC7-311512, Flexible flat cable | U11 | 1A725567-3AY | NAETC-5867-3B, Speaker Impedance pc board <D> |
| | | | | 1A725567-3BY | NAETC-5867-3C, Speaker Impedance pc board <WT> |
| | | | | 1A725567-3CY | NAETC-5867-3C, Speaker Impedance pc board <WT> |
| | | | | | NOTE: THE COMPONENTS IDENTIFIED BY MARK ▲ ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE ONLY WITH PART NUMBER SPECIFIED. |
| | | | | | NOTE: <D> 120V model only <P> 230V model only <WT> Taiwanese model only <PT> Asian model only |

TX-8511

BLOCK DIAGRAM

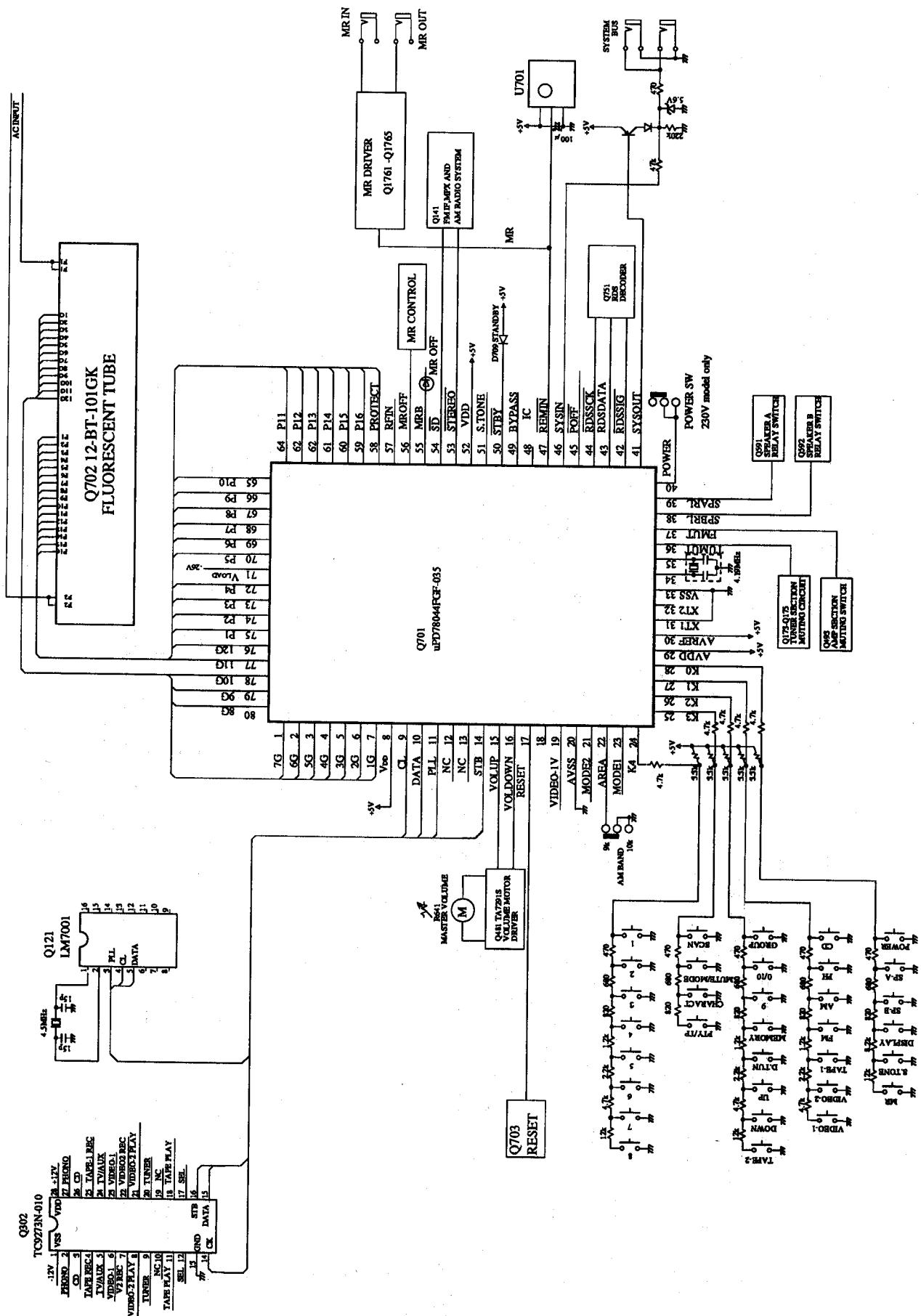


TX-8511



MICROPROCESSOR CONNECTION DIAGRAM

TX-8511



TERMINAL DESCRIPTION

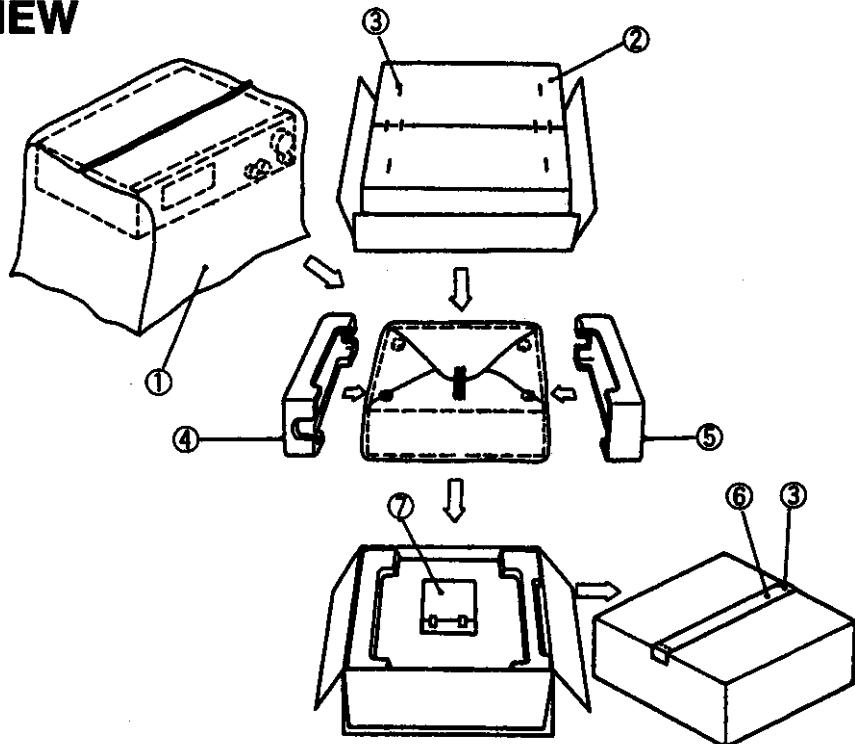
Q701 : μ PD78044FGF-035

| Pin No. | Function | I/O | Description |
|---------|-----------|-----|--|
| 1~7 | 7G~1G | O | Grid control output pin. On at the high level. |
| 8 | VDD | | Power supply pin (+5V) |
| 9 | CL | O | Clock output pin. Connect to the terminals CK of function switch Q302, and PLL IC Q121. |
| 10 | DATA | O | Data output pin. Connect to the terminals DATA of function switch Q302, and PLL IC Q121. |
| 11 | PLL | O | Chip enable output pin for PLL IC Q121. |
| 12 | NC | | Not used. |
| 13 | NC | | Not used. |
| 14 | STB | O | Chip enable output pin. Connect to the terminal STB of function switch Q302. |
| 15 | VOLUP | O | Volume control output pin. |
| 16 | VOLDOWN | O | Volume control output pin. (Refer table 1.) |
| 17 | RESET | I | System reset input pin |
| 18 | NC | | Not used. |
| 19 | VIDEO-1V | O | Video-1 control pin. |
| 20 | AVSS | | Ground pin of A/D converter |
| 21 | MODE2 | I | A or B setting input pin. |
| 22 | AREA | I | Initializing input of band region |
| 23 | MODE1 | I | Initializing input of operation mode |
| 24 | K4 | I | Operation key connection pin |
| 25 | K3 | I | Operation key connection pin |
| 26 | K2 | I | Operation key connection pin |
| 27 | K1 | I | Operation key connection pin |
| 28 | K0 | I | Operation key connection pin |
| 29 | AVDD | | Analogue power supply of A/D converter |
| 30 | AVREF | | Reference voltage input pin of A/D converter |
| 31 | XT1 | | Crystal connection pin for sub system clock resonator |
| 32 | XT2 | | Not used. |
| 33 | VSS | | Ground pin |
| 34 | X1 | | Resonator connection terminal for main system clock |
| 35 | X2 | | Connect the ceramic resonator 4.19MHz. |
| 36 | TUMUT | O | Muting output pin for tuner section. |
| 37 | FRONTMUT | O | Muting output pin for front amp. |
| 38 | SPBRL | O | Relay control pin for speaker B |
| 39 | SPARL | O | Relay control pin for speaker A. |
| 40 | POWER | O | Power source control output pin |
| 41 | SYSOUT | O | System code output pin |
| 42 | RDSSIG | I | Detecor input pin of RDS broadcast. L:RDS broadcast |
| 43 | RDSDATA | I | Data input pin from RDS decoder uPD1346CS |
| 44 | RDSSCK | I | Clock input pin from RDS decoder IC uPC1346CS |
| 45 | POFF | I | Power stoppage detector input pin |
| 46 | SYSIN | I | System code input pin |
| 47 | REMIN | I | Remote control signal input pin |
| 48 | NC | | Not used. |
| 49 | NC | | Not used. |
| 50 | STBY/RECV | O | Standby and received indicator output pin |
| 51 | S.TONE | O | Selective tone control output pin |
| 52 | VDD | | Power supply pin (+5V) |
| 53 | STEREO | I | Detector input pin of FM stereo broadcast |
| 54 | SD | I | Detector input pin of broadcast more than muting level |
| 55 | MROFF | | Multi reem indicator |
| 56 | NC | | Not used |
| 57 | RFIN | I | RF mode input pin |
| 58 | PROTECT | | Detector input pin of protection circuit. |
| 59~70 | P16 - P5 | O | Segment output pins. On at the high level. |
| 71 | VLOAD | I | Pull-down resistor connection pin of controller and driver of FL. |
| 72~75 | P4 - P1 | O | Segment output pins. On at the high level. |
| 76~80 | 12G~8G | O | Grid control output pins. On at the high level. |

| Operation | #15 | #16 |
|-------------|-----|-----|
| VOLUME UP | H | L |
| VOLUME DOWN | L | H |
| STOP | H | H |

Table 1

PACKING VIEW



| REF. NO. | PART NO. | DESCRIPTION |
|----------|--------------|-------------------------------------|
| 1 | 29100034-1AY | Styren Bag 850x650 |
| 2 | 29053096Y | Carton Box <D> |
| | 29053098Y | Carton Box <P> |
| | 29053111Y | Carton Box <PT> |
| | 29053097Y | Carton Box <WT> |
| 3 | 282321Y | Staple |
| 4,5 | 29091763Y | Pad AS |
| 7 | Accessory | |
| | 29342365Y | Instruction manual, E |
| | 29342366Y | Instruction manual, U3FSI <P> |
| | 29342369Y | Instruction manual, T <PT,WT> |
| | 29342367Y | Instruction manual, U3GSWD <P> |
| | 29355133AY | Instruction Sheet (DBP) <P> |
| | 29365019BY | Warranty Card <D> |
| | 29358002KY | Service Station list <D> |
| | 29362090Y | Label (EAN) AS <P,PT,WT> |
| | 29361786Y | Label (Masaysia) <PT,WT> |
| | 29362005-1Y | Label (UPC)AS <D> |
| | 29100097-1AY | Styren Bag, 350x250 |
| | 29361759Y | Label (UL/CUL) <D> |
| | 232140Y | NMA-3057, AM Loop antenna |
| | 292111Y | FM antenna <D> |
| | 292112Y | FM antenna <P,PT,WT> |
| | 25065462 | YAE21-0237, FM adaptor <PT,WT> |
| | 25055018 | CV-K-1, Conversion plug <WT> |
| | 24140329Y | RC-329S, Remote control transmitter |
| | 3010194 | UM-3, Two Batteries |

NOTE: <D> 120V model only
 <P> 230V model only
 <WT> Taiwanes model only
 <PT> Asian model only

ADJUSTMENT PROCEDURES

Preparation

1. Input

FM mono: 1 kHz, 75 kHz devi., 60 dB/ μ V

FM stereo: 1 kHz, 75 kHz devi., 60 dB/ μ V

Pilot signal :19 kHz, 7.5 kHz devi.

AM : 400Hz ,30% mod.

2. Outputs

Connect the non-inductive type resistors of 8 ohms to the speaker terminals A unless otherwise noted.

3. Standard Knob Positions

| | |
|-----------------------------|---------------------------|
| Master Volume Control | Maximum |
| Bass Control | Center |
| Treble Control | Center |
| Balance Control | Center |
| Input Selector..... | CD |
| Tape 2 Monitor..... | CD |
| Muting | Off |
| Selective tone | Off |
| Speaker | A on, B off |
| Speaker Impedance..... | A or B 8 ohm min./Speaker |

IDLING CURRENT ADJUSTMENT

1. Connect the DC voltmeter to the terminals P521 and P522(VCT and IID) on the main circuit pc board.
2. Adjust the trim resistors R533 and R534 so that the indicator of voltmeter becomes 2.0mV.
3. After 4 - 6 minutes of heat runing, readjust R533 and R534 to get 4.8 - 5.2mV.

NOTE: Set Volume knob to the minimum position.

Set speaker impedance selector switch to "A or B 8 ohms min./SPEAKER" position.

Set the unit to the test mode.

1. Press and hold down the CD button, then press the Power button.
2. "TEST-" is displayed on the display.
3. While "TEST-" is displayed, press the FM key.

FM ADJUSTMENT

| Item | Step | Connection of instrument | FM SG output | Stereo modulator output | Tuning frequency | Output indicator | Adjustment point | Adjust for | Remarks |
|-------------------|------|--------------------------|--|----------------------------|------------------|---------------------------------|-----------------------|---------------------------|---|
| FM IF/RF | 1 | Fig.1 | 99.0MHz 1kHz 75kHz devi. 65dBf(60dB) | — | 99.0MHz | DC voltmeter | L101 | 0±20mV | FM MUTE/MODE switch:ON/STEREO Repeat the steps 1 and 3 until no further adjustment is necessary. |
| | 2 | | | | | AC voltmeter | IIFT on the front end | Maximum | |
| | 3 | | | | | Distortion analyzer | L102 | Minimum | |
| Stereo Distortion | | Fig.2 | 99.0MHz Ext. mod. 65dBf(60dB) | Channel L or R 1kHz | 99.0MHz | Distortion analyzer | IIFT on the front end | Minimum | Don't turn more than ±180° |
| Stereo Separation | 1 | Fig.2 | 99.0MHz Ext. mod. 65dBf(60dB) | Channel L 1kHz | 99.0MHz | Channel R AC voltmeter | R150 | Minimum | Maximum and same separation |
| | 2 | | | Channel R 1kHz | | Channel L AC voltmeter | | Minimum | |
| Muting Level | | Fig.2 | 99.0MHz 21.2dBf(16dB) <P/W Models> 23.2dBf(18dB) <D model> | — | 99.0MHz | Oscilloscope or TUNED indicator | R158 | Signal output or light on | |
| RDS | | Fig.3 | 99.0MHz Ext. mod. 40dB | RDS data or 57kHz 3% devi. | 99.0MHz | Oscilloscope | R786 | Maximum | European model only |

AM ADJUSTMENT

120V model

| Step | AM SG output | Tuning Frequency | Output Indicator | Adjustment point | Adjust for |
|------|------------------------------------|------------------|----------------------|---------------------------|------------|
| 1 | | 530kHz | Digital DC voltmeter | OSC coil on RF block L105 | 1.3±0.1V |
| 2 | 600kHz 400Hz 30% mod. 60dB/m | 600kHz | AC voltmeter | RF coil on RF block L105 | Maximum |
| 3 | 990kHz 400Hz 30% mod. 60dB/m | 990kHz | AC voltmeter | L106 | Maximum |

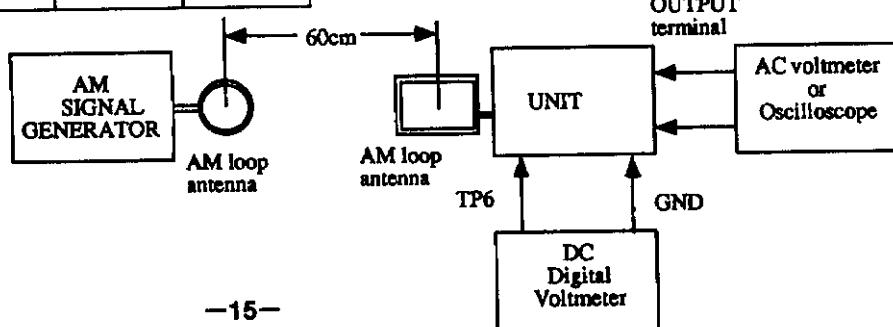
Reference Specification

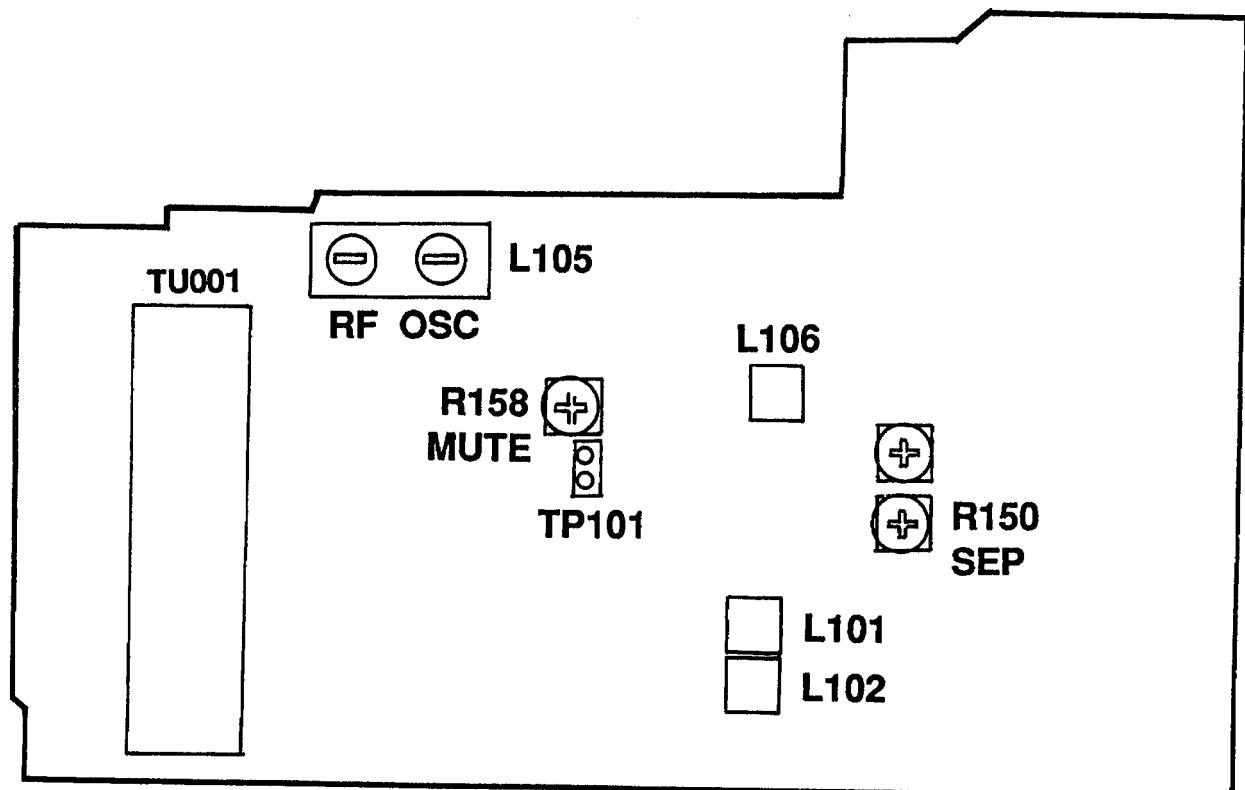
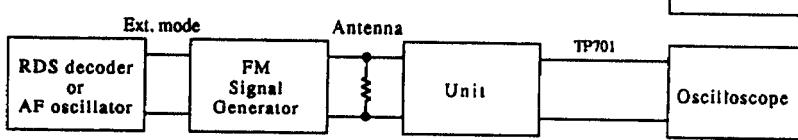
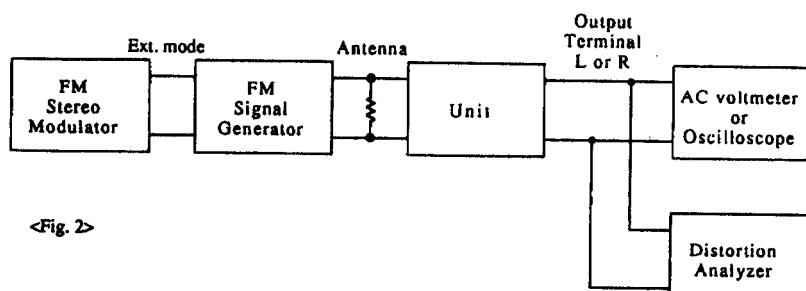
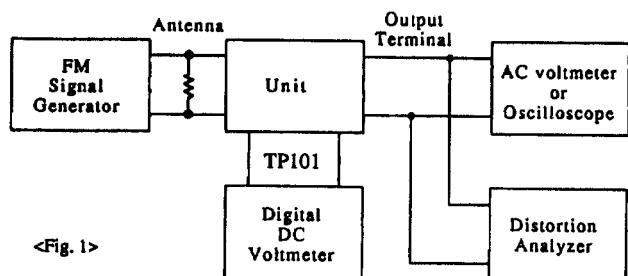
FM tuned voltage: 87.9MHz~107.9MHz
More than 1.3V~Less than 10V
AM tuned voltage: 530kHz~1710kHz
1.3±0.2V~Less than 9.0V

230V and worldwide models

| Step | AM SG output | Tuning Frequency | Output Indicator | Adjustment point | Adjust for |
|------|------------------------------------|------------------|----------------------|---------------------------|------------|
| 1 | | 522kHz or 531kHz | Digital DC voltmeter | OSC coil on RF block L151 | 1.3±0.1V |
| 2 | 603kHz 400Hz 30% mod. 60dB/m | 603kHz | AC voltmeter | RF coil on RF block L105 | Maximum |
| 3 | 999kHz 400Hz 30% mod. 60dB/m | 999kHz | AC voltmeter | L106 | Maximum |

Reference Specification
FM tuned voltage: 87.5MHz~108.0MHz
more than 1.3V~Less than 10V
AM tuned voltage: 522kHz~1611kHz
1.3±0.2V~Less than 9.0V
(230V model)
AM tuned voltage: 531kHz~1602kHz
1.3±0.2V~Less than 9.0V
(Worldwide model)





PRINTED CIRCUIT BOARD-PARTS LIST

| U1 MAIN CIRCUIT PC BOARD (NAAR-5864) | | CIRCUIT NO. PART NO. | DESCRIPTION | CIRCUIT NO. PART NO. | DESCRIPTION |
|--------------------------------------|---------------------------------------|------------------------------------|-------------|---|---|
| | ICs | | | | |
| Q301 | 222502 | NJM4558D-X | | C515,C516 | 354794719 470 μ F,100V, Elect. |
| Q302 | 22240881 | TC9273N-010 | | C521,C522 | 354784709 47 μ F,50V, Elect. |
| Q401,Q402 | 22240250 | NJM2068L-D | | C529,C530 | 374721044 0.1 μ F \pm 5%,50V, Plastic |
| Q481 | 22240239 | TA7291S | | C581 | 354721019 100 μ F,6.3V, Elect. |
| Q921 | 222780125NEC | MPC78M12AHF | | C915,C916 | 3504280 8200 μ F,56V, Elect. \langle D,PT,WT \rangle |
| Q922 | 222790125 | 79M12HF | | C915,C916 | 3504281 10000 μ F,71V, Elect. \langle D \rangle |
| Q923 | 222780565JRC | NJM78M56PA | | C918 | 354761029 1000 μ F,35V, Elect. |
| | Transistors | | | C919 | 354763319 330 μ F, 35V,Elect. |
| Q403-Q406 | 2211945 | 2SK246-GR | | C922-C925 | 354781009 10 μ F,50V, Elect. |
| Q407 | 2213510 or | DTA114ES or | | C926 | 354761019 100 μ F,35V, Elect. |
| | 2214350 | RN2202 | | C928 | 354781019 10 μ F,50V, Elect. |
| Q491,Q492 | 2213631 | RN1241-A | | C932 | 354781009 10 μ F,50V, Elect. |
| Q493 | 2213510 or | DTA114ES or | | C935 | 354754719 470 μ F,25V, Elect. |
| | 2214350 | RN2202 | | C983 | 374721034 0.01 μ F \pm 5%,50V, Plastic |
| | Resistors | | | | |
| Q501-Q504 | 2211733 or | 2SC1845-E or | R393 | 5104288 N11RCL, 250KWT20Z, BALANCE | |
| | 2211732 | 2SC1845-F | R409 | 5104356 N14RLC, 100KWT20Z, BASS | |
| Q505,Q506 | 2211353 | 2SA949-O | R415 | 5104356 N14RLC, 100KWT20Z, TREBLE | |
| Q507,Q508 | 2211733 or | 2SC1845-E or | R511,R512 | 68ohm \pm 5%,1/2W,Metal oxid | |
| | 2211732 | 2SC1845-F | R529-R532 | 82ohm \pm 5%,1/2W,Metal oxid | |
| Q509,Q510 | 2213284 | 2SC1740S-R | R533,R534 | 5210259 N06HR, 2KBC, BIAS | |
| Q511,Q512 | 2211353 | 2SA949-O | R539,R540 | 82ohm \pm 5%,1/2W,Metal oxid | |
| Q513,Q514 | 2211633 | 2SC2229-O | R541,R542 | 68ohm \pm 5%,1/2W,Metal oxid | |
| Q515,Q516 | 2213284 | 2SC1740S-R | R545,R546 | 4000132 0.22ohm \pm 5%,5W,Metal Plate | |
| Q517,Q518 | 2203010 | 2SC5171 | R551,R552 | 453630824 8.2ohm \pm 5%,1W,Metal | |
| Q519,Q520 | 2203000 | 2SA1930 | R563,R564 | 453530224 2.2ohm \pm 5%,1/2W,Metal | |
| Q525,Q526 | 2214984 or | 2SC2631-R or | R565,R566 | 443623914 390ohm \pm 5%,1W,Metal oxid | |
| | 2214985 | 2SC2631-S | R581,R582 | 443523314 330ohm \pm 5%,1/2W,Metal oxid | |
| Q527,Q528 | 2211353 | 2SA949-O | R583-R586 | 453530224 2.2ohm \pm 5%,1/2W,Metal | |
| Q529,Q530 | 2211633 | 2SC2229-O | R925 | 443523314 330ohm \pm 5%,1/2W,Metal oxid | |
| Q581,Q582 | 2211733 or | 2SC1845-E or | R926 | 443522204 22ohm \pm 5%,1/2W, Metal oxid | |
| | 2211732 | 2SC1845-F | R933 | 443524704 47ohm \pm 5%,1/2W,Metal oxid | |
| | Couplers | | | | |
| Q583 | 2211792 | 2SA992-F | L501,L502 | 231176 S-1.3C | |
| Q591-Q593 | 2213640 | DTC123JS | | | |
| Q924 | 2211455 | 2SA1015-GR | P211a | 25055709 NPLG-13P665 | |
| | Diodes | | | P521,P522 | 25055038 NPLG-2P29 |
| D401-D404 | 223163 or | 1SS133 or | P613a | 25055706 NPLG-10P664 | |
| | 223205 | 1SS270A | P301-P303 | | |
| D501,D502 | 22380260 or | RL1N4003 or | | 25045458 or NPJ-6PDBL279 or | |
| | 22380032 | 1SR139-100, GP104003E | | 25045300 NPJ-6PDBL159 | |
| D591,D592 | 223163 or | 1SS133 or | P501 | | |
| | 223205 | 1SS270A | | 25060224 or NTM-8PDML146 or | |
| D915-D921 | 22380260 or | RL1N4003 or | | 25060158 NTM-8PDML084 | |
| | 22380032 | 1SR139-100, GP104003E | P711a | | |
| D922 | 224472704 | MTZJ27D, Zener | | 25051838 or NSCT-31P1625 or | |
| D923-D926 | 223163 or | 1SS133 or | | 25051297 NSCT-31P1086, NSCT-31P758 | |
| | 223205 | 1SS270A | RL591,R592 | | |
| | Capacitors | | | 25065517 or U11 NRL-2P5A-DC24-098 or | |
| C303,C304 | 354741009 | 10 μ F,16V,Elect. | | 25065485 NRL-2P2A-DC24-086 | |
| C307,C308 | 354721019 | 100 μ F,6.3V, Elect. | Q921a | 27160209 RAD-67 | |
| C309,C310 | 374726224 | 6200pF \pm 5%,50V, Plastic | Q921b | 838430107 3TTB+10S(BC), Self-tapping screw | |
| C311,C312 | 374721824 | 1800pF \pm 5%,50V, Plastic | | | |
| C313-C316 | 354741009 | 10 μ F,16V,Elect. | | | |
| C391,C392 | 374721015 | 100pF \pm 10%,50V, Plastic | | | |
| C401,C402 | 354741009 | 10 μ F,16V,Elect. | | | |
| C407,C408 | 354741009 | 10 μ F,16V,Elect. | | | |
| C411,C412 | 354741009 | 10 μ F,16V,Elect. | | | |
| C413,C416 | 374721044 | 0.1 μ F \pm 5%,50V, Plastic | | | |
| C417-C422 | 374721024 | 1000pF \pm 5%,50V, Plastic | | | |
| C433,C434 | 374721534 | 0.15 μ F \pm 5%,50V, Plastic | | | |
| C435,C436 | 374721015 | 100pF \pm 10%,50V, Plastic | | | |
| C437 | 374721044 | 0.1 μ F \pm 5%,50V, Plastic | | | |
| C441 | 354721019 | 100 μ F,6.3V,Elect. | | | |
| C442 | 354780479 | 4.7 μ F,50V,Elect. | | | |
| C501,C502 | 354781009 | 10 μ F,50V,Elect. | | | |
| C503,C504 | 374721015 | 100pF \pm 10%,50V, Plastic | | | |
| C507,C508 | 354724719 | 470 μ F,6.3V, Elect. | | | |
| C513,C514 | 354722219 | 220 μ F,6.3V, Elect. | | | |
| | | | | | |
| | U2 POWER SUPPLY PC BOARD (NAETC-5866) | CIRCUIT NO. PART NO. | DESCRIPTION | | |
| | | Resistors | | | |
| | | R921,R922 | 453530104 | Δ 1ohm \pm 5%,1/2W,Metal | |
| | | | | | |
| | U3 VOLUME PC BOARD (NAETC-5865) | CIRCUIT NO. PART NO. | DESCRIPTION | | |
| | | Resistor | | | |
| | | R641 | 5104334 | N16RGL100KBT, 2SF, VOLUME | |
| | | Socket | | | |
| | | P613b | 25051235 | NSCT10P1025 | |

U4 DISPLAY CIRCUIT PC BOARD (NADIS-5918)
CIRCUIT NO. PART NO. DESCRIPTION

| ICs | | |
|---------------|-------------------------|--|
| Q701 | 22241057 | MPD78044FGF-035 |
| Q751 | 22240679 | MPC1346CS <P,PT> |
| Transistors | | |
| Q703 | 221282 | DTC144ES |
| Q705,Q706 | 2213284 | 2SC1740S-R |
| Q707 | 2213510 | DTA114ES |
| Q791 | 2211255 | 2SC1815-GR |
| Q792 | 2213640 | DTC123JS |
| Diodes | | |
| D701,D702 | 223163 or 223205 | 1SS133 or 1SS270A |
| D703 | 224470913 | MTZJ9.1C, Zener |
| D704,D705 | 223163 or 223205 | 1SS133 or 1SS270A |
| D706,D707 | 224470562 | MTZJ5.6B, Zener |
| D708 | 223163 or 223205 | 1SS133 or 1SS270A |
| D709 | 225290T | SEL4110R, LED |
| D710-D712 | 223163 or 223205 | 1SS133 or 1SS270A |
| D751 | 223163 or 223205 | 1SS133 or <P,PT> 1SS270A |
| D791 | 223163 or 223205 | 1SS133 or 1SS270A |
| D792 | 225291DT | SEL4910D-D, LED |
| Capacitors | | |
| C701 | 3000076 or 3000078T | 0.01F,5.5V Super |
| C702 | 375524744 | 0.47 μ F \pm 5%, 50V, Plastic |
| C703 | 353721019 | 100 μ F, 6.3V, Elect. |
| C704 | 353780109 | 1 μ F, 50V, Elect. |
| C706,C707 | 353780109 | 1 μ F, 50V, Elect. |
| C709 | 354721019 | 100 μ F, 6.3V, Elect. |
| C711 | 353721019 | 100 μ F, 6.3V, Elect. |
| C751 | 354721019 | 100 μ F, 6.3V, Elect. <P,PT> |
| C754 | 374724724 | 4700pF \pm 5%, 50V, Plastic <P,PT> |
| C755,C756 | 374723324 | 3300pF \pm 5%, 50V, Plastic <P,PT> |
| C757 | 354780229 | 2.2 μ F, 50V, Elect. <P,PT> |
| C758 | 374724734 | 0.047 μ F \pm 5%, 50V, Plastic <P,PT> |
| C759 | 374722234 | 0.022 μ F \pm 5%, 50V, Plastic <P,PT> |
| C760 | 374724724 | 4700pF \pm 5%, 50V, Plastic <P,PT> |
| Resistor | | |
| R786 | 5210265 | N06HR, 50KBC, BPF PC <P,PT> |
| Coils | | |
| L701-L703 | 233454K220 | NCH-1452, 220K |
| Sockets | | |
| P211b | 25051238 | NSCT-13P1028 |
| P711b | 25051875 or 25051335 | NSCT-31P1662 or NSCT-31P1124, NSCT-31P727 |
| Plug | | |
| TP701 | 25055038 | NPLG-2P29 <P,PT> |
| FL Tube | | |
| Q702 | 212157 | 12-BT-102GK |
| Holder | | |
| Q702a | 27190989 | HOLDER(FL) |
| Switches | | |
| S701 | 25035652 | NPS-111-S604 <D> |
| S702-S713 | 25035632 | NPS-111-S604 |
| S715-S725 | 25035652 | NPS-111-S604 |
| S726 | 25035548 | NPS-111-S510 <P,PT> |
| S731-S738 | 25035652 | NPS-111-S604 |
| S739 | 25035653 | NPS-122-L605 <P,PT,WT> |
| Remote sensor | | |
| U701 | 24130011 | PIC-12043TE2 |
| Ceramic lock | | |
| X701 | 3010163 | CST-4.19MGW |

| CIRCUIT NO. | PART NO. | DESCRIPTION |
|-------------|----------|-----------------|
| X751 | 3010203 | AF6146CG <P,PT> |

| US TUNER CIRCUIT PC BOARD (NARF-5919) | | |
|---------------------------------------|----------|-------------|
| CIRCUIT NO. | PART NO. | DESCRIPTION |

| US TUNER CIRCUIT PC BOARD (NARF-5919) | | |
|---------------------------------------|----------|-------------|
| CIRCUIT NO. | PART NO. | DESCRIPTION |

| ICs | | |
|-------------|------------|---|
| Q121 | 22240090 | LM7001 |
| Q141 | 22240983 | LA1851N-F |
| Transistors | | |
| Q101 | 2210746 | 2SC945A-P <P,PT,WT> |
| Q102 | 2211723 | 2SC1923-O |
| Q122 | 2213510 | 2SC1740S-R |
| Q123 | 2212445 | 2SK365-GR |
| Q124 | 2213284 | 2SC1740S-R |
| Q142 | 2213510 | DTA114ES |
| Q143 | 221282 | DTC144ES |
| Q144 | 2213640 | DTC123JS |
| Q171,Q172 | 2213284 | 2SC1740S-R |
| Q173,Q174 | 2212794 | 2SD1468-R |
| Q175 | 2213510 | DTA114ES |
| Q182 | 2213284 | 2SC1740S-R <P,PT> |
| Diodes | | |
| D101,D102 | 223191 | SD101 |
| D165 | 224470512 | MTZJ5.1B, Zener |
| Front end | | |
| TU001 | 240104 | ENV172D2G1 <D> |
| | 240103 | ENV172A2G1 <P,PT,WT> |
| Capacitors | | |
| C001 | 354741019 | 100 μ F, 16V, Elect. |
| C106 | 354742209 | 22 μ F, 16V, Elect. |
| C107 | 354784799 | 0.47 μ F, 50V, Elect. |
| C127 | 354721019 | 100 μ F, 6.3V, Elect. |
| C130 | 354780229 | 2.2 μ F, 50V, Elect. |
| C131 | 354722234 | 0.022 μ F \pm 5%, 50V, Plastic |
| C132 | 354783399 | 0.33 μ F, 50V, Elect. |
| C133,C142 | 354741019 | 100 μ F, 16V, Elect. |
| C145 | 354741009 | 10 μ F, 16V, Elect. |
| C146 | 354723324 | 3300pF \pm 5%, 50V, Plastic |
| C147 | 354721534 | 0.015 μ F \pm 5%, 50V, Plastic <D> |
| C147 | 354721034 | 0.01 μ F \pm 5%, 50V, Plastic <P,PT,WT> |
| C149 | 354780479 | 4.7 μ F, 50V, Elect. |
| C151,C152 | 354780109 | 1 μ F, 50V, Elect. |
| C153 | 354783399 | 0.33 μ F, 50V, Elect. |
| C154 | 354741009 | 10 μ F, 16V, Elect. |
| C155,C156 | 374721034 | 0.01 μ F \pm 5%, 50V, Plastic <D> |
| C155,C156 | 374724724 | 4700pF \pm 5%, 50V, Plastic <P,PT> |
| C155,C156 | 374725624 | 5600pF \pm 5%, 50V, Plastic <WT> |
| C159 | 354780229 | 2.2 μ F, 50V, Elect. |
| C160 | 354784799 | 0.47 μ F, 50V, Elect. |
| C162,C166 | 333741009 | 10 μ F, 16V, Elect. |
| C171,C172 | 354741009 | 10 μ F, 16V, Elect. |
| C173,C174 | 374721024 | 1000pF \pm 5%, 50V, Plastic <D> |
| C175,C176 | 374722724 | 2700pF \pm 5%, 50V, Plastic <P,PT,WT> |
| C177 | 354780229 | 2.2 μ F, 50V, Elect. |
| C178 | 354741009 | 10 μ F, 16V, Elect. |
| Resistors | | |
| R150 | 5210261 | N06HR, 5KBC, Septation |
| R158 | 5210264 | N06HR, 30KBC, Mute |
| Coils | | |
| L101 | 233457 | NPIF-4081 |
| L102 | 233458 | NPIF-4082 |
| L103 | 233471 | NMC-6084 <P,PT,WT> |
| L104 | 233454K220 | NCH-1452, 220K |
| L105 | 232174 | NMRF-5077 |
| L106 | 232139 | NMIF-4062 |
| L107,L108 | 233484 | NMC-4085 <P,PT,WT> |
| L109,L110 | 231092 | NCH-2140 <D> |

PRINTED CIRCUIT BOARD-PARTS LIST

| CIRCUIT NO. | PART NO. | DESCRIPTION | CIRCUIT NO. | PART NO. | DESCRIPTION |
|---|--|---|--|-------------------------------------|--|
| P101 | Terminals 25060239 or 25060195 25060222 or 25060117 25060222 or 25060117 | NTM-4PDML161 or NTM-4PDML117 <D> NTM-2PDML144 or NTM-2PDML051 <P,PT> NTM-2PDML144 or NTM-2PDML051 <WT> | P251 | Jack 25045462 or 25045339 | NPJ-4PDYE283 or NPJ-4PDYE190 |
| TP101 | Plug 25055038 | NPLG-2P29 | Q1761-Q1763 | Transistors 221282 or 2213560 | U9 RI TERMINAL CIRCUIT PC BOARD (NADIS-5922) |
| TU001a | Shield plate 27150397 | <P,PT,WT> | Q1764 | 2213510 or 2214350 | CIRCUIT NO. PART NO. DESCRIPTION |
| X101 | Ceramic filters 3010071 | SFE10.7MA5, (RED) | D1761,D1763 | Diodes 223163 or 223205 | DTCL44ES or RN1204 |
| X102 | 3010130 | SFE10.7MZZA <P,PT,WT> | D1762 | 223163 or 223205 | DTA114ES or RN2202 <D> |
| X103 | 3010071 | SFE10.7MA5, (RED) | D1764 | 223163 or 223205 | 1SS133 or 1SS270A |
| X105 | 3010123 | SFZ-450JL | | 1SS133 or 1SS270A <D> | 1SS133 or 1SS270A <P,PT,WT> |
| X104 | Resonator 3010268 | CSB456P23 | C1761 | 100 μ F,6.3V, Elect. | Capacitors 354721019 |
| X121 | 3010141 | XTL-7.2M | C1762 | 4700pF \pm 5%, 30V, Plastic | 374724724 |
| U6 POWER SUPPLY CIRCUIT PC BOARD (NAPS-5920) | | | P1761 | 100 μ F,6.3V, Elect. | |
| CIRCUIT NO. PART NO. DESCRIPTION | | | P1762 | 4700pF \pm 5%, 30V, Plastic | |
| Q951 | Transistor 2213284 | 2SC1740S-R | P1763 | 25045481 | Jacks 25045433 |
| D951-D954 | Diodes 22380260 or 22380032 | ▲ RL1N4003 or 1SR139-100, GP104003E | P1764 | 25045293 | NPJ-2PDYL299, RI |
| D955 | 223163 or 223205 | 1SS133 or 1SS270A | Q1765 | 24120043 | HSJ-1003-01-013, MR <D> |
| C901 | Capacitors 3500191 | ▲ 0.01 μ F,400VAC, IS C | S1761 | 25065286 | HSJ-1003-01-012, MR <P,PT,WT> |
| C952 | 354742219 | 220 μ F,16V, Elect. | | | |
| Resistors R901 | | | U10 HEADPHONE PC BOARD (NAETC-5923) | | |
| R951 | 431533355 | ▲ 3.3M ohm \pm 10%,1/2W, Solid <D> | CIRCUIT NO. PART NO. DESCRIPTION | | |
| | 453530824 | 8.2 ohm \pm 5%,1/2W, Metal | P503 | Jack 25045255 | YKB21-5009, Headphone |
| Transformer T902 | | | U11 SPEAKER IMPEDANCE (NAETC-5867) | | |
| | 2300670A | ▲ NPT-1111D, Power <D> | CIRCUIT NO. PART NO. DESCRIPTION | | |
| | 2300671A | ▲ NPT-1111P, Power <P,PT> | | | |
| | 2300672A | ▲ NPT-1111DG, Power <WT> | | | |
| Fuse Holders P901a | | | S911 | Switch 25065437 | |
| P902a,P903a | 25050065 | YSH403T <D> | | | NSS-22157P, Speaker Impedance <D> |
| | 25050065 | YSH403T <P,PT,WT> | | | |
| P901a | Plug 25055675 | ▲ NPLG-2P631 | | | |
| P902 | AC Outlets 25051126 | ▲ NSCT-4P913 <D> | NOTE: THE COMPONENTS IDENTIFIED BY MARK ▲ | | |
| P903 | 25051125 | ▲ NSCT-4P912 <P,PT,WT> | ARE CRITICAL FOR RISK OF FIRE AND | | |
| RL901 | Relays 25065515 or 25063508 | ▲ NRL-1P5A-DC12-096 or ▲ NRL-1P10A-DC12-093 | ELECTRIC SHOCK. REPLACE ONLY WITH | | |
| S901 | Switch 25065437 | ▲ NSS-22157P, Voltage Selector <WT> | PART NUMBER SPECIFIED. | | |
| U7 VIDEO CIRCUIT PC BOARD (NAETC-5921) | | | NOTE: <D> 120V model only | | |
| CIRCUIT NO. PART NO. DESCRIPTION | | | <P> 230V model only | | |
| Q253 | IC 222840661 | 4066B | <WT> Taiwanes model only | | |
| Q251,Q252 | Transistors 2213284 | 2SC1740S-R | <PT> Asian model only | | |
| D251 | Diode 223163 or 223205 | 1SS133 or 1SS270A | | | |
| C251,C252 | Capacitors 354721019 | 100 μ F,6.3V, Elect. | | | |
| C255,C256 | 354724719 | 470 μ F,6.3V, Elect. | | | |
| C257 | 354721019 | 100 μ F,6.3V, Elect. | | | |
| C259 | 354741019 | 100 μ F, 16V, Elect. | | | |

NOTE: THE COMPONENTS IDENTIFIED BY MARK **A**
ARE CRITICAL FOR RISK OF FIRE AND
ELECTRIC SHOCK. REPLACE ONLY WITH
PART NUMBER SPECIFIED.

NOTE: <D> 120V model only
<P> 230V model only
<WT> Taiwanese model only
<PT> Asian model only

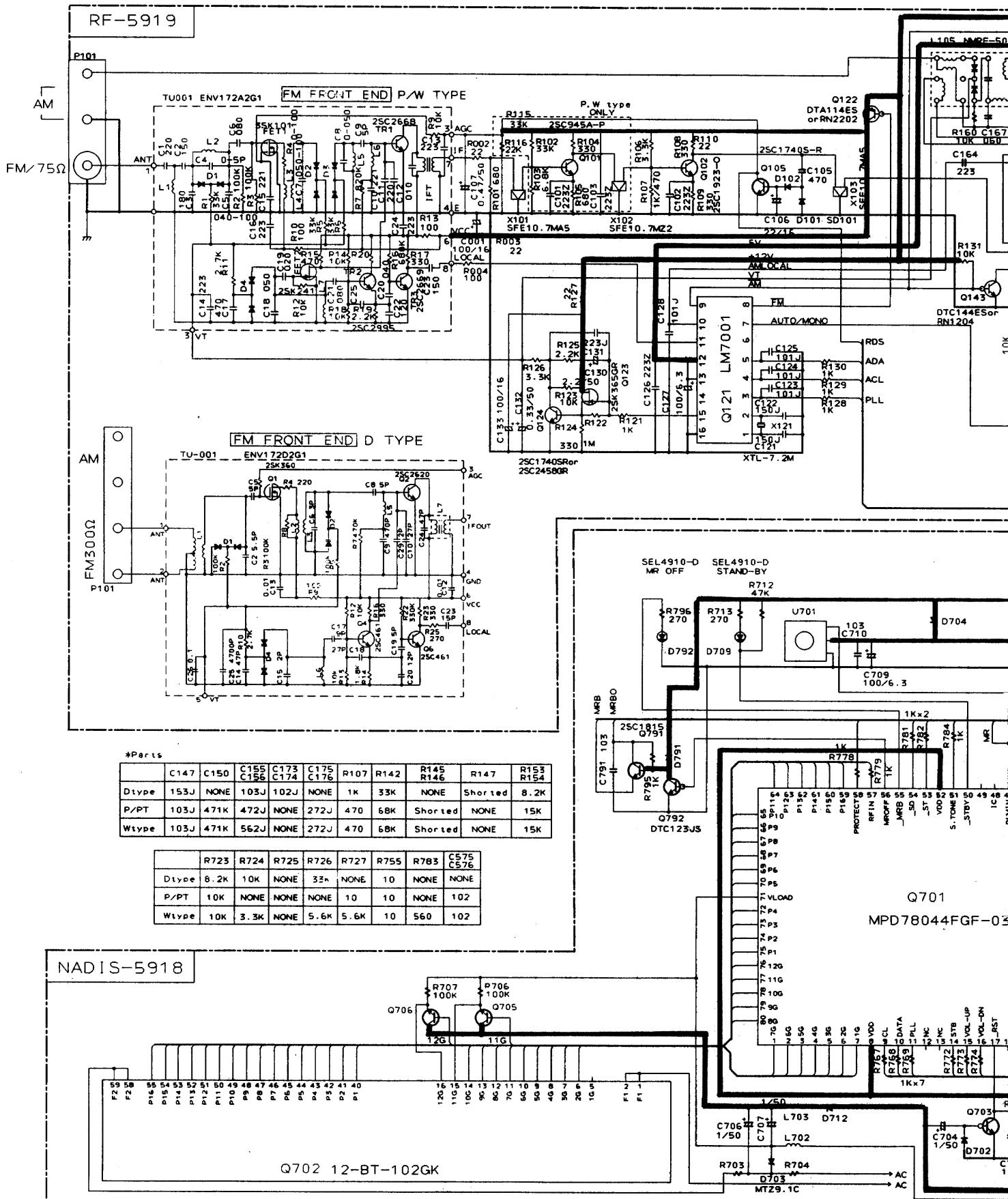
A

B

C

D

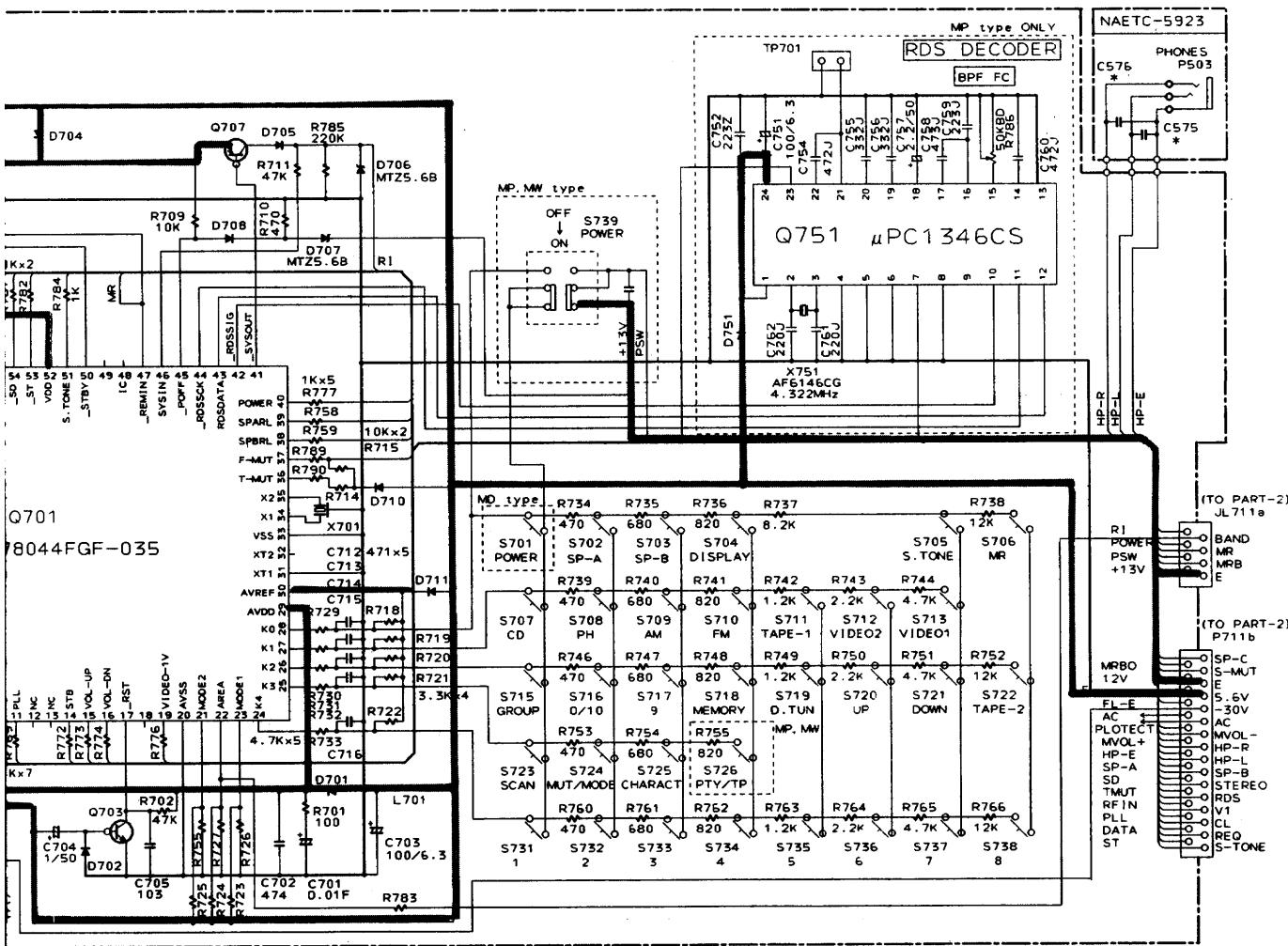
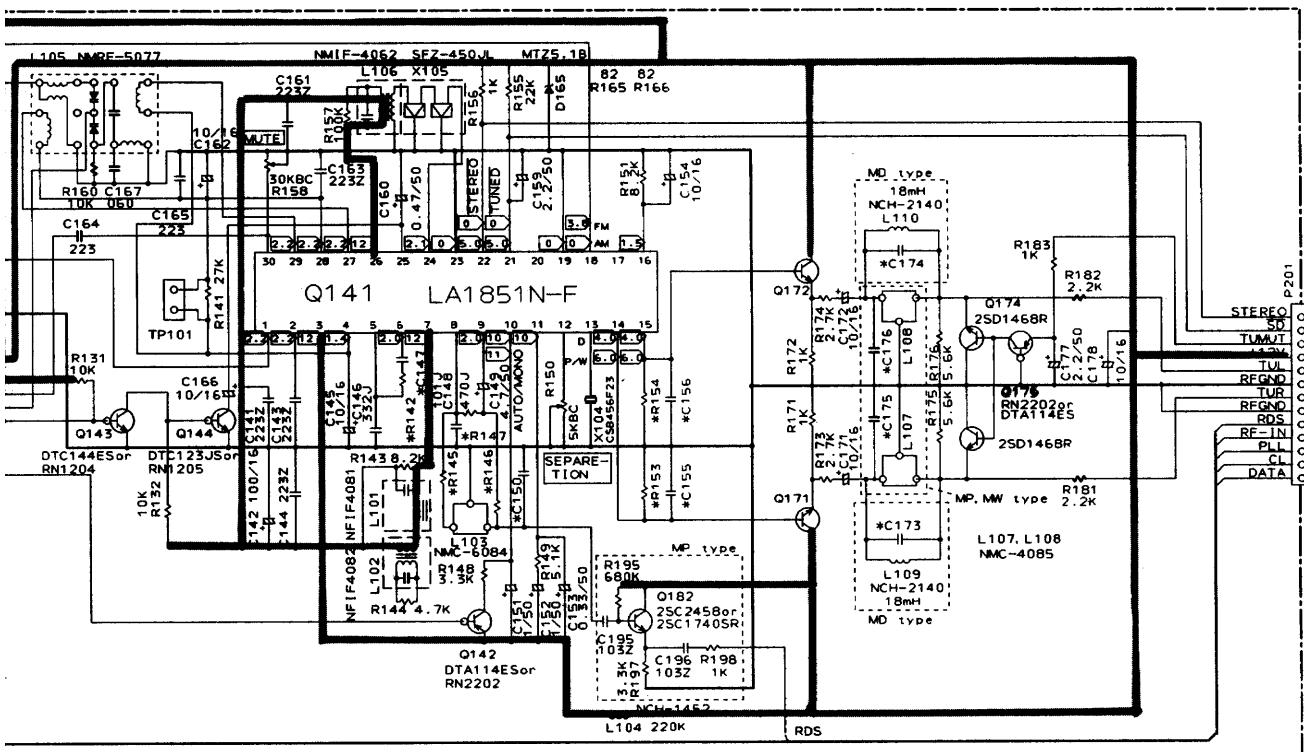
SCHEMATIC DIAGRAM PART-1



E

F

G



D

E

F

G

